SEMPERVIVUM GLOBIFERUM

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IN trying to identify recent collections of *Sempervivum* from Turkey, it became evident that existing herbarium specimens with glandular or glabrous rosette leaves had been identified mainly under the names *S. globiferum* L., *S. ruthenicum* Koch and *S. armenum* Boiss. & Huet. As the first two names were known to be widely used for species which occurred in Europe and in the Caucasus, it was necessary to check their identity, as a preliminary to any work on Turkish material, and then to make sure that the plants from Turkey and the Caucasus under these names did in fact represent the same species. Further investigation of the problem has brought to light some interesting facts, the most important being that:

1. It is not advisable to retain the name *S. globiferum* L. for any of these plants.
2. The name *S. ruthenicum* Koch is invalid as it was published in synonymy only.
3. *S. ruthenicum* Schnittsp. et Lehm. is the correct name for much material passing as *S. globiferum* L. or *S. ruthenicum* Koch; it is not so far known to occur in Turkey or in the Caucasus but appears to be widespread in SE Europe.
4. *S. zelebori* Schott is a distinct species and not, as previously thought, synonymous with *S. ruthenicum* Koch. It is recorded from the Balkans and SE Europe, but its distribution at present is probably inadequately known.
5. The Caucasian plants previously included under *S. globiferum* L. and *S. ruthenicum* Koch cannot be identified as *S. ruthenicum* Schnittsp. & Lehm. and probably comprise an aggregate group of species. One species, which is found about Tiflis but has not so far been recognised in Turkey, is here described.

KEY

1. Rosette open, leaves yellowish green, with very short glandular pubescence; styles glandular almost to apex . . . 3. *S. transcaucasicum*

\+ Rosette incurved, dull green or glaucous; styles glandular only at base . . . 2

2. Inflorescence 10–20 cm; petals clear yellow with violet base; filaments violet; scales rounded, nearly contiguous, horizontal; carpels evenly pubescent . . . . 2. *S. zelebori*

\+ Inflorescence 20–30 cm; petals greenish yellow at first, later tinged with purple at the base; filaments white at first, then pale rose; scales widely spaced, distinctly upcurved, carpels pubescent with a fringe of longer hairs on the inner margin . . . . . . 1. *S. ruthenicum*

1. **S. ruthenicum** Schnittspahn & Lehmann in Flora 38: 5 (1855); Komarov, Fl. U.R.S.S. 9: 21 (1939); Săvulescu, Fl. R.P.R. 4: 74 (excl. pl 10) (1956).

Syn.: *S. globiferum* L. emend. Koch in Flora 18: 217, t. 1 (1835); Syn. Fl. Germ. ed. 2, 289 (1843) vix L.

S. globiferum L.; Led. Fl. Ross. 2: 189 (1844–6); Schur. Enum. Pl. Transs. 228 (1866) vix L.

S. ruthenicum Koch, Syn. Fl. Germ. ed. 2, 289 (1843) in syn.; Praeger, Acc. Semp. Group, fig. 23 (right hand plant only) and excl. synonyms and descr. (1932).

S. braunii Led. Fl. Ross. 2: 190 (1844–46) p.p.

TYPE: Cultivated specimen: Darmstadt, ex hort. botan. comm. *Director Schnittspahn*, 1855 (W).

UKRAINE: Distr. Tscherkassy, prope R. Samussinka, 27 vii 1923, *S. Rostryhan* (W); Kharkov distr., Novo-vodolaskia region, Ljubotinsk, on R. Moz, 19 viii 1928, *V. Transzeli* (LE); Charkov, *Steven* (K); Ostra Mogita, prope Skalat (Galiciae orientalis)—in saxis gypsaceis, frequens. *J. Kotschy* (BM); Kiev, 13 vii 1898, *A. Vocharov* (LE).

ROMANIA: Moldova, distr. Neamtu; ad Magura Petricica, prope oppidum Piatra Neamtu, in glareosis: alt. c. 450 m, 27 vi 1946: *C. Burduja;* Stanco Stefanesti, jard. Botosami, calcar, 20 vii 1949, *E. J. Nyárády* (Hb. E. J. Nyarady).

WITHOUT LOCALITY: Ex hort. bot. Petropolitani, July 1868 (LE—as *S. braunii*).

There has been considerable confusion over the application of the name *S. globiferum* L. and since its publication by Linnaeus (Species Plantarum 464: 1753) some six or seven species have been identified with it by different authors. The original description is very brief and in itself impossible to restrict to any one species of the genus—"S. foliis radicalibus in globum congestis ciliatis, propaginibus globosis. Flores flavi nec rubri. Habitat in Rutheno. D. Gmelin". The references cited in synonymy cover several species of *Sempervivum* sens. lat. and the specimen in the Linnaean herbarium is probably, but not certainly, identifiable as *Jovibarba sobolifera.* There is no specimen in the *Hortus Cliffortianus* herbarium and although Linnaeus makes reference to a specimen sent to him by D. Gmelin this plant does not appear to have influenced his description, which in general indicates a member of the genus *Jovibarba.* In Morison's *Historia* the description is of a 6-petalled greenish white flower and refers quite clearly to a species of *Jovibarba* and the plant illustrated is *Jovibarba* except in the flower, which is that of a *Sempervivum* with 11 petals. The description in Bauhin's *Historia* is less adequate and the illustration unidentifiable.

It has been thought that because of the reference (Species Plantarum 464: 1753) to a specimen collected by D. Gmelin a Caucasian species was intended, as Gmelin collected only in the Caucasus; but the Linnaean specimen is not a Caucasian species and there is nothing in the description or references to suggest one. The name *S. globiferum* L. must be abandoned.

Russian floras have used the name to cover yellow-flowered species of *Sempervivum* with glandular leaves from the Caucasus and Turkey, but it is now known that there is definitely more than one species in this category.

Koch (in Flora 18: 209–219, t. 1: 1835) drew attention to the confusion which existed under the name in the Species Plantarum, and himself described *S. globiferum* with a very clear illustration by Sturm of a plant sent to him by Besser from the Crimea, easily recognisable as a species widespread in eastern Europe. Later (Syn. Fl. Germ. ed. 2, 289: 1843), he emended Linnaeus' description of *S. globiferum*, referring to his earlier paper, but as these descriptions cannot definitely be said to correspond to one of the elements included by Linnaeus, it is unfortunately not possible to retain the name on Koch's authority. In his key to the genus (in the Syn. Fl. Germ.) Koch cites *S. ruthenicum* Koch in hort. Erlangen as a synonym of *S. globiferum*, and this name has been widely used, although it was invalid. The name was again used by Schnittspahn and Lehmann (in Flora, 38: 5: 1855) for a plant [grown from seed] received from a botanic garden. This, they suggested, was probably the same as *S. ruthenicum* Koch and a specimen in the Hb. Naturhist. Mus. Wien, communicated by Schnittspahn from the Botanic Garden of Darmstadt is clearly identifiable as *S. globiferum* L. sens. Koch. *S. ruthenicum* Schnittsp. & Lehm. therefore is the first valid name for this species and must be adopted.

S. zelebori Schott, which has been regarded as synonymous with *S. ruthenicum* Koch (Hayek, 1924–7: Praeger, 1932: Stojanoff & Stefanoff, 1948), is here separated as a distinct species (see below).

S. armenum Boiss. & Huet (Boiss. Diagn. ser. II no. 2: 60 (1856)) was later included in synonymy under *S. globiferum* L. emend. Koch by Boissier (Fl. Orient. 2: 797 (1872)). The original description is clear and refers to a plant with rosette and lower cauline leaves quite glabrous at maturity and recent collections have confirmed the existence of this species in Turkey. Boissier's description of *S. globiferum* L. emend. Koch is based on Turkish specimens and these cannot now be referred to *S. ruthenicum* Schnittspahn & Lehmann.

As described by Schnittspahn & Lehmann *S. ruthenicum* is a plant with large rosettes, incurved in winter but more open in summer, the leaves dark green, club-shaped, narrowed at the base and short-glandular with densely ciliate margins: stolons 3–5 cm long: stem leaves oblong, rather weakly pointed with reddish brown apex: flowers yellow with linear lanceolate petals and small rounded scales which stand out clearly. Reference is made to *S. globiferum* L. as emended by Koch and to *S. globiferum*, Bot. Mag. t. 507, excluding text and locality, but the latter is apparently in error, as the plate illustrates *S. grandiflorum* Haworth.

The characters which separate this species from *S. zelebori* and *S. transcaucasicum* here described are the rather large rosettes with dull green incurved leaves (with or without a brownish purple apex); 5–8 cm in length and an unusually tall inflorescence 20–30 cm in height. The calyx is very deeply cut with narrow linear lobes and the carpels, which are pubescent all over, have a conspicuous fringe of longer hairs on the inner margin, a character which appears to separate this species from all others in the group.

2. **S. zelebori** Schott in Ost. Bot. Wochenbl. 7: 245 (1857).

Syn.: *S. ruthenicum* Koch; Velenovsky, Fl. Bulg. 188 (1891); Hayek, Prodr. Fl. Pen. Balc. 1: 720 (1924–7); Praeger, Acc. Sempervivum Group, p.p., 80–83 (1932), excl. syn.: description only and fig. 23 (left-hand plant); Jávorka and Csapody, Mag. Fl., Kap. 222, fig.

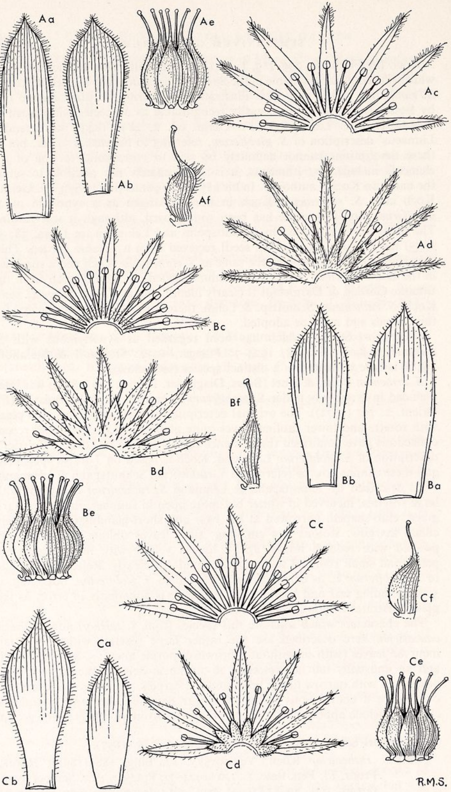


FIG. 1. *Sempervivum ruthenicum* and allied species.
A. *S. ruthenicum*. B. *S. transcaucasicum*. C. *S. zelebori*; a. stem leaf; b. rosette leaf; c. section of calyx and corolla (upper surface); d. section of calyx and corolla (lower surface); e. gynoecium; f. single carpel (lateral view).

1653 (1929–34); Miller in Quart. Bull. A.G.S. 3: 261, 278, illus. 263, 274 (1935); Stojanoff & Stefanoff, Fl. Bulg. 3 ed. 547 (1948) —non Schnittsp. & Lehm.

BULGARIA: Varna, on limestone rocks, 15 vii 30, *H. Zerny* (W); 16 vii 30, *K. H. Rechinger* 875 (W); Karlik Dagh, Bulgarian—Greek frontier, 1450 m, 2 vii 26, *W. B. Turrill* 1157 (K); Grasnei Kost. c. 3000 ft. vii 1863, *Zelebor* (W).

ROMANIA: Matschin v. Dobrudscha, 4 viii 1873, *Sintenis* 660 (K); in saxis montis Treskovac inter pagas Svinitza et Drenkova, 3 viii 1886, *A. de Degen* 48 (E, K); solo calcareo, 2300 ft. an Treskova av Danubium inf. Banateji, 29 vii 1828, *Zohatsch* (LE).

This species has long suffered not only from confusion of identity with the eastern European *S. ruthenicum* Schnittsp. & Lehm., but also from the confusion of synonymy which has always surrounded the latter species. Later authors submerged it under *S. ruthenicum*. In his "Account of the Sempervivum Group" in 1932, Praeger included in synonymy under "*S. ruthenicum* Koch" both *S. zelebori* Schott and *S. armenum* Boiss. & Huet without giving any reason to support this view. Turrill, in discussing the status of *S. armenum* in relation to *S. globiferum* L. (sub *S. minus*, Hook. Icon. Pl. 35: t. 3401: 1940) suggested then that further investigation was needed, and that these species might prove to be distinct. Since then recent collections in Turkey make it possible to establish again the identity of *S. armenum*, and re-examination of the type description of *S. zelebori* and comparison with herbarium material and plants in cultivation all indicate that Schott's species does exist, although its true distribution is probably very incompletely known.

The main points which separate *S. zelebori* (as described by Schott), from *S. ruthenicum* S. & L. are the incurved rosette of light green or glaucous leaves, short stemmed stolons, clear yellow flowers with ovate calyx lobes, dark purple filaments and small, rounded, almost contiguous nectarial scales. It is known to occur in S & E Bulgaria and in southern Romania and it is probably also in Hungary. Owing to the scarcity of herbarium material available, however, this distribution can only be regarded as incomplete. A specimen in the Vienna herbarium collected by *Zelebor* in 1863 as *S. globiferum* but later identified as *S. zelebori* agrees very well with Schott's description and with plants now in cultivation, usually under the name of *S. ruthenicum*.

The rosettes are compact, and globular 4–5 cm diam. with pale or glaucous green, densely pubescent almost velvety leaves, with or without a small dark tip and more or less distinctly keeled on the lower surface: offsets usually few on short stout stolons: inflorescence 10–15 cm with 4–5 branches and oblong-lanceolate, loosely divergent cauline leaves; flowers comparatively large, 2·5 cm diam., 12–14 partite, with ovate to ovate lanceolate calyx lobes and clear yellow petals, usually with a purple base (although this character is not given in Schott's description); stamens 5–6 mm long with deep purple filaments, wider and flatter at the base and sparsely glandular; anthers yellow: scales greenish yellow, shallow, rounded and almost contiguous, more or less horizontal: carpels green, densely and evenly glandular all over, with erect or slightly spreading styles.

3. **Sempervivum transcaucasicum** Muirhead, **sp. nov.**

A *S. zelebori* Schott rosulis semiapertis, rosularum foliis flavo-viridibus brevioribus glanduloso-pubescentibus, stylis valde puberulis differt; a *S. ruthenico* Schnittsp. & Lehm. caulibus floriferis brevioribus, foliis caulinis imbricatis multo carnosioribus distinguitur.

Rosula 5–7 cm diam., dense multifoliata. *Rami* propaginiferi pauci, 1–3 (5), breves, 2–3 cm longi, validi. *Folia* rosularia obovata vel oblanceolata, breviter mucronata, subflavo-viridia, ad apicem rosea, utrinque dense et breviter glanduloso-pubescentia, margine ciliata. *Caulis* florifer 15–18 cm altus, breviter glanduloso-pubescens. *Folia* caulina imbricata, oblongo-lanceolata, mucronata, glauco-viridia, exteriora roseo-tincta, 2·5 cm longa, 1 cm lata, dense et breviter glandulosa. *Inflorescentia* densa, ramis 2–3 multifloris: alabastra obtusa. *Flores* 2·5 cm diam., 12–14-meri, sessiles vel pedicellis 1–2 mm longis instructi. *Calyx* cum receptaculo 5–6 mm longus, dense glanduloso-pubescens, viridis; segmenta lanceolata vel lineari-lanceolata, c. 4 mm longa, 1 mm lata, viridia, apice purpurea, recurva. *Petala* 9–11 mm longa, 1 mm lata, lineari-lanceolata, ad apices contorta, viridi-lutea, ad basem pallide purpurea, in pagina inferiore dense glanduloso-pubescentia. *Stamina* 24–26, c. 6 mm longa, filamenta rosei-purpurea, dimidio inferiore dense pubescentia; antherae luteae. *Squamae* parvae, viridi-luteae, oblongae, valde recurvae, disjunctae. *Carpella* 7–8 mm longa; ovaria 4 mm longa, 1·5–2 mm lata, viridia, utrinque breviter et dense glanduloso-pubescentia; styli 2–3 mm longi, dimidio inferiore dense pubescentes, valde divergentes.

CAUCASUS: Georgia: Tbilisi: hillsides near the Dabahane Gorge, opposite the Tbilisi Botanical Institute, alt. 550–650 m, rocky metamorphic slope, flowers pale yellow, 29 vi 1959, *P. H. Davis* 33719 (holo. E); in rupestribus prope castrum Tiflis, June 1839, *R. F. Hohenacker* (K).

TRANSCAUCASIA: Armenia rossica: distr. Akhalaxi, in rupestris prope pagum Czunceli, 13 viii 1907, *E. Bordzilowski* (LE).

Misidentified as *S. globiferum* auctt.; Boiss. Fl. Or. 2: 797 (1872) excl. syn. p.p.; Kom. Fl. U.R.S.S. 9: 21 (1939) excl. syn. p.p.; Wale, Quart. Bull. A.G.S. 10: 106, illus. 103 (1942); Grossheim, Key to Pls. Caucasus, 64 (1949) p.p.; Fl. Kavkas 4: 259, 315 (1950) p.p.; Takhtadzhyan, Fl. Arm. 3: 347, t. CIII (1958).

The name *S. globiferum* L. has been widely used in Russian and Turkish floras to cover most yellow-flowered species of *Sempervivum* occurring in the Caucasus and Turkey. Two distinct species with the mature rosette leaves almost entirely glabrous are now recognised in Turkey: *S. armenum* Boiss. et Huet and *S. glabrifolium* Borissova; and there is a third closely related species, *S. sosnowskyi* Ter. Chat., so far known from only one locality in the Caucasus. There remains, however, a considerable group of species with glandular-pubescent leaves and yellow flowers, which is apparently widespread in the Caucasus and Turkey, and possibly extends into Kurdistan. These may be closely related forms of one major species as in the European *S. marmoreum* or a complex group of geographically distinct species. Until they can be brought into cultivation it is hardly possible or advisable to describe them from available herbarium material.

The species here described, *S. transcaucasicum*, was first introduced into cultivation by Mr. W. E. Th. Ingwersen in 1935 from the neighbourhood of Tiflis and specimens were collected there in 1959 by Dr. P. H. Davis. A specimen from Akhalaxi in the Transcaucasus compares very well with the Tiflis plant, and it is probably widespread in the Caucasus. So far this species has not been recognised in Turkish material, although it may well be expected to occur there also.

It is distinguished from other known glandular leaved species by its yellowish green finely pubescent rosette leaves flushed with pink in the upper half, comparatively large purple-tinged flowers with light purple filaments, densely glandular in the basal half and the widespread, strongly upcurved rectangular scales and very glandular styles.

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